Apache httpd Web Server - installation from source code
This module provides a step by step guide on compiling Apache web server on a Linux host. A freely available Knoppix Linux can be used as a live CD to serve as the Linux environment. On any Windows computer with a CD ROM the students can download the .iso file for Knoppix and burn it on an optical media. Alternatively, VMware Player can be used to run the .iso live CD.

Start the lab by booting your Knoppix system. You can simply put it in a CDROM and restart the computer or you can use a VMware virtual machine. Once you see the Knoppix desktop simply click on the Console icon at the bottom of the screen. You can stay logged in as the knoppix user. Open the Terminal window for the lab and type in commands into the Terminal.

Exercise:
Step 1

Problem:

1. Download Apache sources. You can download the source code directly from the Apache Foundation (http://httpd.apache.org/), or you can use the local GRCC repository. In the classroom the local download will be much faster.

Solution:

wget http://raider.grcc.edu/~smachaje/co246/httpd-2.0.59.tar.gz

Exercise:
Step 2

Problem: 2. Decompress and extract the source files.

Solution:

tar -xzvf httpd-2.0.59.tar.gz

Exercise:
Step 3

Problem: 3. Change directory to the source directory.

Solution:

cd httpd-2.0.59

Exercise:
Step 4

Problem:

4. Clean source tree. If you are compiling for the first time you can skip this step. Executing this step will not change any configuration.

Solution:

make clean

Exercise:
Step 5

Problem: 5. Configure the sources.

Solution:

./configure --prefix=/home/knoppix/apache --with-port=8080

Exercise:
Step 6

Problem: 6. Compile source code

Solution:

make

Exercise:
Step 7

Problem: 7. Install source code

___

Solution:

make install

Exercise:
Step 8

Problem: 8. Start Apache server

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Solution:

cd /home/knoppix/apache

bin/apachectl start

Exercise:
Step 9

Problem: 9. Test to check if Apache is running

___

Solution:

Open the browser and navigate to http://localhost:8080/

Exercise:
Step 10

Problem: 10. Test with terminal commands

___

Solution:

netstat -ln |grep 8080

ps -ef |grep httpd

Exercise:

Step 11

Problem:

11. To start the entire process over run the following command to delete your apache system. ATTENTION! The rm -rf command will uninstall or delete the Apache Web Server.

Solution:

killall httpd

rm -rf /home/knoppix/apache

Apache httpd Web Server - basic configuration
Exercise:
Configuration file

Problem:

Open and review the main configuration file for our Apache installation.

> **Note:** You can use any text editor. The solutions will use leafpad from Knoppix liveCD. Other editors on the Knoppix CD include: vi, xedit, nano, pico.

Solution:

`leafpad /home/knoppix/apache/conf/httpd.conf`

Exercise:

Problem:

First let's fix the error message which comes up every time we start apache. The message says:

httpd: Could not determine the server's fully qualified domain name, using 127.0.0.1 for ServerName

Solution:

To fix it edit the httpd.conf file (leafpad /home/knoppix/apache/conf/httpd.conf) and change the ServerName directive to be: `ServerName localhost:8080`

The directive before the change:

`#ServerName www.example.com:80`

The directive after change:

`ServerName localhost:8080`

Save the file and restart apache:

`cd /home/knoppix/apache bin/apachectl stop bin/apachectl start`

or

`/home/knoppix/apache/bin/apachectl restart`

Now you shouldn't see an error message when Apache starts.

Exercise:

Problem:

Find the following directives and change their values in the configuration file. For new configuration to take effect you have to save the configuration file and restart apache. Above at the end of step 1 you will find the commands to restart apache.

```
Find the following directives and change their
values:

A)

Change ServerAdmin to your email address.
Before change: ServerAdmin you@example.com
Change to:
ServerAdmin myemail@host.com

B)
```

Add index.php to the default pages. Before
change: DirectoryIndex index.html
index.html.var

Change to:
DirectoryIndex index.html index.html.var
index.php

C)
Change the detail of logging. Before change:
LogLevel warn

Change to:
LogLevel error

D)
Change Server Signature:
ServerSignature Email

E)
Change the server HTTP Header information:
ServerTokens Prod

F)
Change the user and group which Apache runs as:
User knoppix
Group knoppix

Solution:

Test the excercise by visiting the following
urls on the your server:

```
http://localhost:8080/manual/

http://localhost:8080/icons/
(note at the bottom of the icon files the
localhost link.
It should have your email address as the
destination url)

http://localhost:8080/cgi-bin/test-cgi
(if you get an error here that's fine. to fix
the error run:
chmod 777 /home/knoppix/apache/cgi-bin/*

view the HTTP HEADERS of your server:
wget --spider -S http://localhost:8080/
```

Exercise:
Virtual Hosts

Problem:

```
1. Setup site host names

Edit /etc/hosts. You need to edit the lines as
the root user.  In the terminal type in:

            su

            leafpad /etc/hosts

add the following lines:

127.0.0.1 www.co246.com
127.0.0.1 go.co246.com
127.0.0.1 student.co246.com
```

Exit the shell as root so you are logged in as Knoppix.

Test the host names by visiting the urls in a browser. Remember to start the Apache server on port 8080.

2. Configure Apache to recognize Virtual Hosts

Edit httpd.conf and add the following sections:


```
# Use name-based virtual hosting.
#
NameVirtualHost *:8080

#
# VirtualHost example:
# Almost any Apache directive may go into a
VirtualHost container.
# The first VirtualHost section is used for
requests without a known
# server name.
#

<VirtualHost *:8080>
ServerAdmin student@grcc.edu
DocumentRoot /home/knoppix/go_co246_htdocs/
ServerName go.co246.com
ErrorLog logs/go_co246_error_log
CustomLog logs/go_co246_access_log common
</VirtualHost>

<VirtualHost *:8080>
ServerAdmin student@grcc.edu
```

```
DocumentRoot
/home/knoppix/student_co246_htdocs/
ServerName student.co246.com
ErrorLog logs/student_co246_error_log
CustomLog logs/student_co246_access_log common
<VirtualHost>

<VirtualHost *:8080>
ServerAdmin student@grcc.edu
DocumentRoot /home/knoppix/www_co246_htdocs/
ServerName www.co246.com
ErrorLog logs/www_co246_error_log
CustomLog logs/www_co246_access_log common
<VirtualHost>
```

3. Create each DocumentRoot directory with a sample index.html page. For example create:

```
mkdir /home/knoppix/www_co246_htdocs
cd /home/knoppix/www_co246_htdocs
echo "This is www_co246 site" > index.html

mkdir /home/knoppix/go_co246_htdocs
cd /home/knoppix/go_co246_htdocs
echo "This is go_co246 site" > index.html

mkdir /home/knoppix/student_co246_htdocs
cd /home/knoppix/student_co246_htdocs
echo "This is student_co246 site" > index.html
```

Solution:

Open a browser and navigate to

http://www.co246.com, http://go.co246.com,
http://student.co246.com

Apache httpd Web Server - logs lab
Exercise:

Problem:

```
1. Enable extended server status in httpd.conf
file.
You can find instructions in the Apache manual
http://httpd.apache.org/docs/2.0/mod/mod_status
.html

2. Generate Apache activity:

apache/bin/ab -n 200 -c 1
http://localhost:8080/

apache/bin/ab -n 200000 -c 1000
http://localhost:8080/

3. View the server status at:
http://localhost:8080/server-status

4. Monitor log files at apache/logs/
tail -f apache/logs/access_log

5. Generate error logs:
apache/bin/ab -n 200 -c 1
http://localhost:8080/`date +%s`

for ((i=1;i<5;i+=1));  do apache/bin/ab -n 2 -c
1 http://localhost:8080/`date +%s`; sleep 2;
done;
```

Solution:

Monitor log files at apache/logs/

```
cat /home/knoppix/apache/logs/access_log
```